USE OF WOOD ENERGY IN RELATION TO DEFORESTATION IN WUSHISHI LGA, NIGER STATE, NIGERIA

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Abstract: *Most of the fuelwood consumption are been practice even in advanced nations where more than 75 % of harvested wood in some of these nations is utilized as energy. The over-dependence on wood fuel for energy in Wushishi Local Government Area (LGA) which was used mainly in this area of study since of its prices are moderately low as well as easy availability among additional reasons. In this study, was aim at evaluating the influence of firewood used on the forest resources in Wushishi LGA? About ten (10) wood fuel work shop situated in a locations which are strategic within Wushishi LGA were carefully chosen and purposively sampled. However, technique used was random sampling were adopted to select the households. A major criterion used to choose the households was whether or not they use wood fuel as their major source of energy. Accordingly, 46 households were selected. Information were collected using primary data which was achieved by consultations with wood fuel traders, questionnaire surveys along with field observations. Findings revealed among others that fuelwood/charcoal, kerosene and electricity representing 83.7%, 15% and 1.3% respectively are sources of energy used by households in Wushishi LGA. The majority (89%) reported that the ease of use of fuel wood in the forest as well as in the markets has been declining in the area and that the distance they usually travel to collect firewood is increasing. This is an indication that the collection of firewood from the forest is negatively affecting forest resources. Lack of awareness, access and the high cost of unconventional sources of energy are the main reasons the respondents use fuel wood instead alternative energy sources. The study revealed that there is no tree planting effort carried out by respondents for the sustainability of forest resources. From the result obtained in this work, some of the suggestion were deduced: since renewable energy resources are obtainable in almost all areas within the nation, integrated approach needs to be adopted in order to sustain energy improvement by ensure that technologies bring about improvement on the area of energy to decrease the request on fuel wood. Sensitization programmes should be organized for residents on alternative energy sources and the corresponding alternative energy technologies made available to residents of Wushishi. Furthermore,* education on deliberate tree planting is *advocated.*

Keywords*: Education, Deforestation, Fuelwood, Household, Nigeria*

1. INTRODUCTION

Demand for energy internationally was estimated in coming years to increase rapidly, with lifestyle changes as well as inhabitants development in advance economies placing ever greater request on present supply grids on energy. Africa in particular may be true, where financial improvement can be linked directly to demand for energy: up to 1% development in GDP is estimated to entail about 0.55% growth in production of energy (Kebede *et al.,* 2010). In addition, Africa as a continent constitutes about 13% of the globe populace on the other hand used up only 5.6% of the energy supply globally as of 2008. As a result, it is projected that African as a continent per-capita energy use (ca. 41% of the worldwide typical) is expected to

changing way of life, increase with growing trade as well as improving substructure (Edenhofer, 2011).

The basis of energy derived from fuel wood through burning logs resources such as twigs wood. The conventional source of energy as a wood fuel which continued has the main source of firewood for over half of the domain's population (Julia, 2000). Advance nations account for supreme of the consumption of fuel wood as well as up to about 75% of wood harvested in these nations is utilized as firewood (Bearer *et al.,* 2008).

The fuel wood which is normally used by the community for energy in Wushishi LGA where this work focus mainly since of its easy accessibility as well as relatively low prices. Some other reasons consider in this study area are difficulty in the provision of the normal fuel as well as the increasing inhabitants by means of a larger section still deteriorating lower than profits that cannot come up with the money for the cost of conventional fuels (Adedayo, 2005). Fuel wood is been used at different levels and in diverse ways along with life of the majority of rural inhabitants in a places like Wushishi LGA these is based on either indirectly or directly on fuel wood. On the other hand, the needs for fuel wood energy used in the nation has become an enormous job as a result of the vast amount of required wood. Firewood consumed daily through rural inhabitants in some of the country is high like in Nigeria it's estimated to be around 27.5 million kg/day (Ogunsawa, 2002). This was observed by another researcher of a recent figures made available through the Solar Cooking Collection which placed the approximation of Nigeria's firewood consumption of energy at about 87%. For that reason, many of the Nigeria rural inhabitants have been consuming and will continue to use the dried biomass fuel for energy for many years to come (Wamukonye, 2001). The unmaintainable area of manufacture of fuel obtained from wood in Nigeria is expected to go on for some time as long as the energy predicament confronting the nation remains unresolved. The nation still observes irregular supply of petroleum products (Gas and Kerosene), and when accessible the expenses are more than what ordinary people can afford. The consequence is not farfetched, as many inhabitants will have option to firewood, which is even now is in out of reach to supply (Arnold, 2006).

The tenacious poor eminence, insufficient amount along with low access to energy even though Nigeria's huge internal endowments in non-renewable as well as renewables most important energy resources are continuously affecting domestic energy supply and translating into great threat on Nigeria's forestry. However, lack of exploitation of these primary energy resources have caused an invariable over dependence on only the biomass of forest resources, especially in rural areas which is now being threatened by total devastation.

Nigeria has a 100% tropical forest type. Natural forests continue to be the main source of wood supply (FAO, 2009). Deforestation is described through United Nations Framework Convention on Environment Variation is the straight human induced conversion of forested land to non-forest uses. It is the complete removal of forest vegetation to provide land for other uses. Nigeria has a populace of more than 170 million people with an average inhabitants progressing in degree of 2.5% (FAO, 2009). 52% of the population live in the rural communities and do not earn enough to pay for fuel or electricity. 70.8% are in absolute poverty, below $1 per day with 0.826 metric tons carbon dioxide emissions per capita per year (World Bank, 2006). Also, with this growth in population as well as without the concomitance of technological improvement or economic increase the high amount of deforestation is inevitable. This paper is therefore an attempt to explain the relationship between deforestation in Wushishi LGA and the Nigeria's domestic energy crisis as epitomized by the unsustainable

fuel wood harvest.

2. Factors Leading to the Demand for Fuel wood in Nigeria

Price Hikes in petroleum Products: Nigeria as an entire hurts from intermittent strikes, labor unrest as well as fuel scarcities throughout price hikes of petroleum products. The prices of petroleum products keep on increasing by the years, since 1990 to 2017, the costs have more than tripled (Babanyara and Saleh, 2010).

Affordability: Based on United Nation Conference on Habitat (UNCH, 1990), even though the accessibility of contemporary sources of energy to some city inhabitants, the most of the refugees from village to city or town regions (whom in Nigeria give rise for 65% of the city inhabitants in 1991 to more than 70% in 2006) cannot manage to pay for them. They used to obtain their fuel from wood; nevertheless for them to be accumulating it, they currently have to purchase from retailers; indicating that firewood is more inexpensive compare to conservative fuel like cooking gas as well as kerosene along with other energy sources. Affordability is obtainable through profits. Osinubi (2003) stated that the severity and depth of dangerous lack growth every day more than seven crease in city of Nigeria when likened to a two crease in village regions.

Lack in cities of Nigerian is prevalent. Based on Danmole (2002), the Development of Human Report (2004) noted that approximately 71% of people living in Nigeria live on a smaller amount of US$1 day-to-day, despite the fact that just about 91% of the inhabitants survives on a smaller amount of US$2 day-to-day. Lack is a main influence in environmental degradation as well as urban congestion. Furthermore, it is a vast risk to the ecological stability, political steadiness as well as social unity of our cities and pending it is embark upon once and for all, maintainable city growth will continue to be a hallucination (Danmole, 2002).

In addition, Mabogunje (2005) further that prolonged lack in city regions is comprehended as much more visible and complex compared to the problems of severe need in villages region of Nigeria. This intensely direct the increasing inhabitants of the less privileges in the city areas and the strictness of the circumstances joined with the fact that in Nigeria, economizing as well as unemployment, retrenchment or rank sizing is the directive of the day. With enlarged inhabitants of the less privilege, a lot of individuals went back the use of fuel wood for the reason that increasing financial privation that happens among the people of Nigeria.

Accessibility: Energy has a most important influence on every single phase of clean, our socio-economic life and reliable energy source is a pre-requisite for maintainable improvement along with fight in contrast to deficiency. Energy, particularly electrical energy, is vital in rising the living standard of the general public, nevertheless the epileptic power outages as well as electricity supply in Nigeria of not more than 10 hours in day have made this a hallucination (Onyegebu, 2003). Similarly, the Daily trust Newspaper of march 15, 2007 volume 16(4) pp. 1-4, specified that Nigeria's biggest electricity plant has a capability of 1300 megawatts is producing merely 600 megawatts, with a short fall of about 700 megawatts.

In the same way, the extensive lines for buying of kerosene, be a sign of its scarceness. The circumstances mentioned above enforced users to divert to the more eagerly accessible power for food preparation and that is fuel wood. Moreover, a lot of wood is spent when gas or kerosene became rare. The practice of wood as a fuel in Nigerian city parts is additional made conceivable as a result to enhanced conveyance substructure which made likely the introduction of enormous quantity of wood for fuel from the village regions into the city regions. Cline-Cole *et al.* (1988) noted that in Kano state, fire wood are smuggled into the metropolitan region from the village regions from a distance of about 300-4000 km. This is

additionally supported through Nancy (1994) that source is harvested from ever more distant wood lands, others are up to 300 km or even more than right from the metropolitan centers of Nigeria.

2.1 Consequences of Fuel wood Usage as a Source of Energy

There are well-being effects and risky ecological related through the practice of some sources of energy. The World Health Organization approximations that up to about 1.5million general public per year pass away ahead of time from interior toxic waste as a result of the use of solid petrol. This is corresponding to about 4000 passing away daily. However, it has been projected that there are 40,000 current issues of lingering bronchitis every year as a result of contact to smoke and soot (World Bank, 2006). In some Sub-Saharan region within Africa, the amount of general public relaying on biomass as their most important fuel for cooking is 575 million (76%). This number consist of 413 million (93%) rural dwellers along with 163 million (53%) metropolitan dwellers. Interior air eminence is therefore a vigorous concern for the reason that deaths that result from biomass burn rank extremely in Yearly Worldwide Death by Cause.

Findings according to World Energy outlook 2006 cited in Olubusola (2007) indicate that deaths from fuel wood smoke rank second after malaria in Annual Worldwide Deaths by Cause. It also ranks advanced than HIV/AIDS along with Tuberculosis. In the framework of Environmental Health, the practice of deforestation when fuel wood is gathered has an undesirable influence on the environs (Modi *et al.,* 2006).

Deforestation can have an extensive consequence on plants, animals and humans that be influenced through on the wood/forest land environment for shelter and food. Increasing deforestation can likewise make an environment more inclined to desert as well as erosion encroachment (Darkoh, 1993). Additional consequence of deforestation is the discharge of stored carbon into the atmosphere; this has extensive consequences to the World at large and even Global Climate system.

2.2 The Impact of Felling of Trees on the Environment

Demand for metropolitan fuel wood which leads to the uncritical cutting down of trees, major wet wood which in turn leads to deforestation. The joint effects of felling of trees for industrialization, road construction, urbanization, as well as timber have enormously donated to deforestation along with deficiency of fuel wood in Nigeria (Nura, 2006). Rural dwellers in their offer to rise their profits by wood produce for urban fuel wood source surge their deficiency ultimately, the reason is that, unselective cutting down of trees, with renewal deliberate than consumption, may cause these renewable supply to deplete or reduce, and this is a procedure of deforestation along with growth in metropolitan request for fuel wood. Deforestation is certain to establish in and in turn cause desertification. Effect of deforestation in Nigeria comprises of the following:

Erosion: When trees are censored down, the land becomes susceptible to hence land dilapidation and erosion in the form of desertification. Nigeria as a nation is presently loosing 351,000km2 of its land to recompense and is increasing south wards, (Amadi *et al.,* 2016) a circumstances if not checkmated will put agricultural manufacture in predicaments.

Economic Problems: From the time when agriculture is the main profession of village dwellers and metropolitan centers be determined through on the village regions for food, a failure in manufacture signifies a weakening in the low-cost of village dwellers and starvation for Nigerians.

Loss of Valuable Flora Species: The unselective felling of trees generates damage of appreciated tree classes which could be used in enlightening increase agricultural yield and crop variety. Damage of Appreciated Fauna Sorts: The disappearance or reduction of the vegetation (loss of habitat) may occasionally lead to the destruction of certain wildlife sorts.
Fuel Wood Scarcity: The amount of fuel wood used in Nigeria since 1985 was 87.587 million cubic meters. Obuah in (2000) established that 55 million tons of charcoal as well as fuel wood were burnt, along with improved to 80 million cubic meters (43.4 x 109 kg) of fuel wood yearly for internal and cooking usages (Sambo, 2005). Based on Yahaya (2002), there are straight association among fuel wood demand and human population, from this time the cutting down of wet wood can said to be on the increase. The amount of fuel wood consumption in Nigeria go beyond the degree of manufacture. It is therefore right to say this renewable source of energy would sooner or later be scarce, should these form of utilization carry on.

3. MATERIALS AND METHODS

3.1 The Study Area

Wushishi is a Local Government Area (LGA) in Niger State, Nigeria. Its headquarters is in the town of Wushishi. Wushishi LGA consists of eleven wards which include: Sabon Gari, Kwata, Barwa, Lokogoma, Maito, Kodo, Gwarjiko, Tudun-Yamigi, Akare and Kanwuri.

3.1.1 Location of the Study Area

The State lies on latitude 8º to 11º 30’ North and Longitude 03º 30’ to 07º 40’ East. The State is bordered to the North by West by Kebbi State, Zamfara State, South West by Kwara State, South by Kogi State, South East by FCT (Figure 1.1) and North-East by Kaduna State. The State also has an International Boundary with the Republic of Benin along Agwara and Borgu LGAs to the North West.

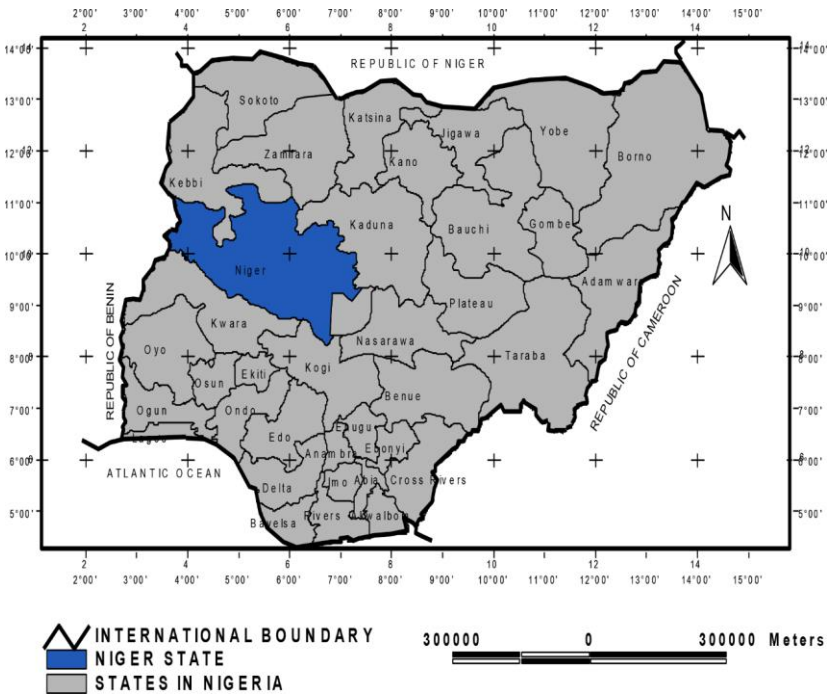

Figure 1.1 Map of Nigeria Showing Niger State
Source: Niger State Ministry of Lands and Housing

Wusishi LGA lies between latitude 9^0 54`N and 9º27'N and longitude 6º 38`E to 6º 51'E (Figure 1.2 and 1.3). It is situated 50 km from Minna, Niger State Capital. The LGA is bounded by Rafi LGA to the North, Mashegu LGA North-West, Lavun LGA to West, Gbako LGA to South and Bosso LGA to the West.

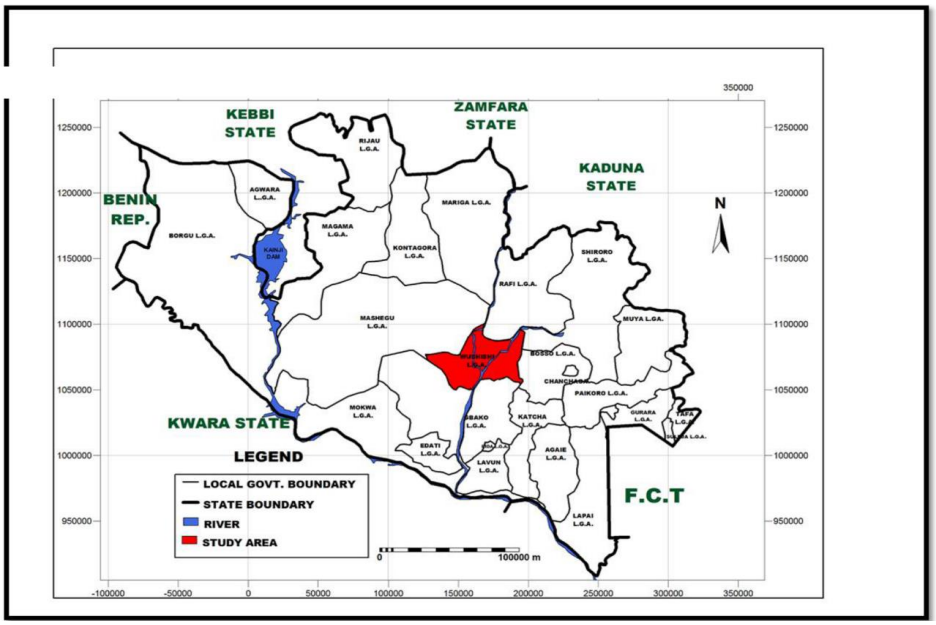

Figure 1.2: Map of Niger State Showing Wushishi LGA
Source: Niger State Ministry of Lands and Housing

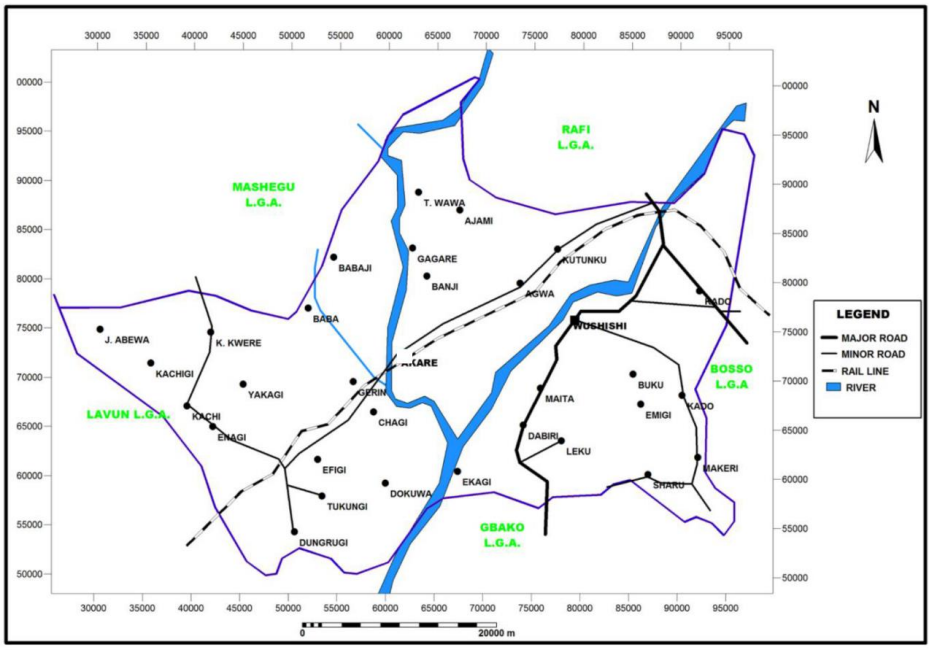

Figure 1.3: Map of Wushishi LGA the Study Area
Source: Niger State Ministry of Lands and Housing

3.1.2 Demography of the Study Area

Wushishi LGA of Niger State covers approximately 1,779 km^2 of Land mass and as at 2006 has a population of 81,783 people using the figures of 2006 population and Housing Census (Niger State Department of Budget & Planning, 2006). The Population of Zungeru as at 2006 is 24,447 people (Niger State Department of Budget & Planning, 2006) having an elevation of 149m above mean sea level.

3.1.3 Economic Activities of the Study Area

Agriculture is the main occupation of the people in the study area, both rain-fed and irrigation systems. During raining season where most of the population of the area are engaged in farming; crops produced during the raining season are rice, yam, maize, legumes, beans and groundnut. Irrigation activities is being practiced during the dry season leading to the cultivating of crops like vegetables, fruits, rice and some root crops that is yam and cassava. During the dry season male farmers engage in irrigation farming.

Female farmers also do trading in yam, rice, and maize. They also process gari while some do pottery making, weaving, fish smoking, rope and mat making. However, these are insignificant when compare with farming in terms of income generation. Fishing is practiced within the River Ekpiri that boosts the economic activities of the people economy (Badwee *et al.*, 1990).

3.2 Methodology

Ten (10) fuel wood depots located in strategic locations around Wushishi LGA were purposively selected and sampled. Random sampling technique was used to select the households. A major criterion used to choose the households was whether or not they use fuel wood as their major source of energy. Accordingly, 46 households were selected. A survey on households, key informants and focus group discussions was carried out to collect quantitative and qualitative data. Primary data were collected through interviews with wood fuel dealers, field observations and questionnaire surveys were also used to determine the locations of major wood fuel depots in Wushishi. Secondary data were obtained from magazines, journals, annual reports from Government and Non-Governmental Organizations, relevant and related information were also obtained from the internet.

4. RESULTS AND DISCUSSION

4.1 Socio- economic and demographic characteristics of respondents

Findings from the study revealed that 34% of the respondents were male while 66% were female. About 9.3% of the respondents were under the age of 25 years 52.7% of the heads of households were within the age range of 21 and 40 years; approximately 32.8% belongs to the age group of 41 to 50 years. The heads of the households were over the age of 50 years and constituted 5.2% of the respondents. Therefore, the results of this study revealed that the majority of the respondents are in the economically active age group.

The distribution of respondents according to educational level show that 30.3% of the respondents only attained the level of primary school, 35.0% attained the level of secondary school which is the majority, whereas 34.7% attained an educational level up to tertiary institution. Educational level attained can have a direct effect on reliability of data collected as a more educated person can easily respond to questions presented in the questionnaires administered.

4.2 Pattern of Household Energy Consumption

Findings revealed that fuelwood, leaves, charcoal, and electricity are sources of energy in Wushishi LGA; majority representing 83.7% of the households are dependent on fire wood as a source of fuel for cooking and heating as shown in Figure 1.

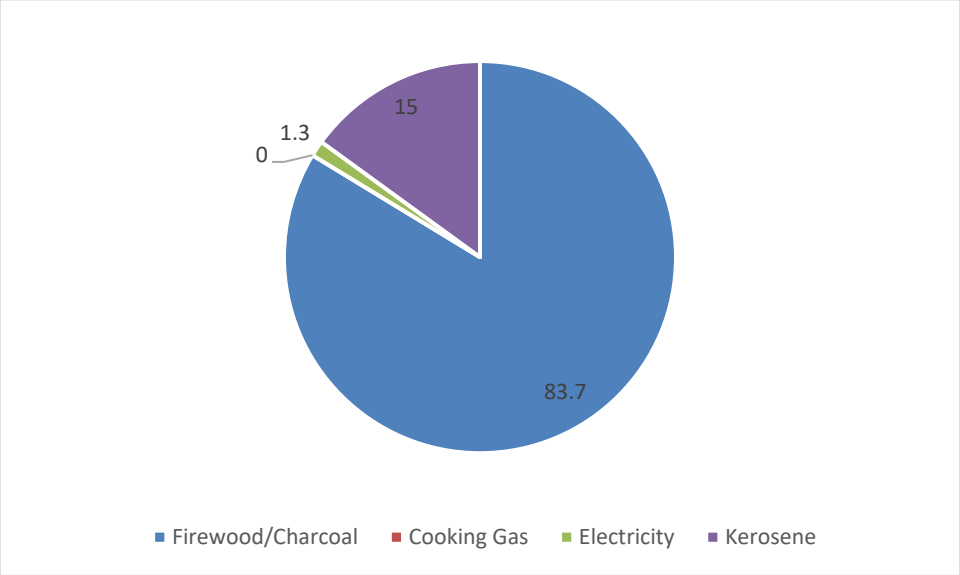

Figure 1: Pattern of the Household Energy Consumption

4.3 Sources and Availability of Fuel Wood

Findings revealed that 83.14% of the households collect fuel wood from the communal forest while, 16.86% purchase fire wood and charcoal form dealers. Also, majority of the respondents (89%) said that the availability of fuel wood in the forest as well in the markets has been declining in the area whereas, 11% of the respondents believed that the availability of fuel wood is still abundant.

4.4 Distance Travelled to Collect Fuel Wood

Results of the study revealed that 89% of the respondents reported that the distance they travel to collect fuel wood is increasing year after year whereas, 11% of them reported that the distance they travel to collect fuel wood remained the same over the years. This is an indication that the collection of firewood from the forest is negatively affecting forest resources.

4.5 Factors that Determine the Use of Fuel Wood

It was discovered that the respondents use fuel wood instead of alternative energy sources due to the following reasons; the lack of access to alternative energy sources (31.7%); lack of awareness on the alternative energy sources (29.1%); smokes from the fuel wood helps in heating their houses and also as repellant for insects and snakes (3.2%); and the high cost of alternative energy sources (36%). The result is an indication that high cost, lack of awareness, and access to alternative energy sources are the main reasons the respondents use fuel wood instead alternative energy sources.

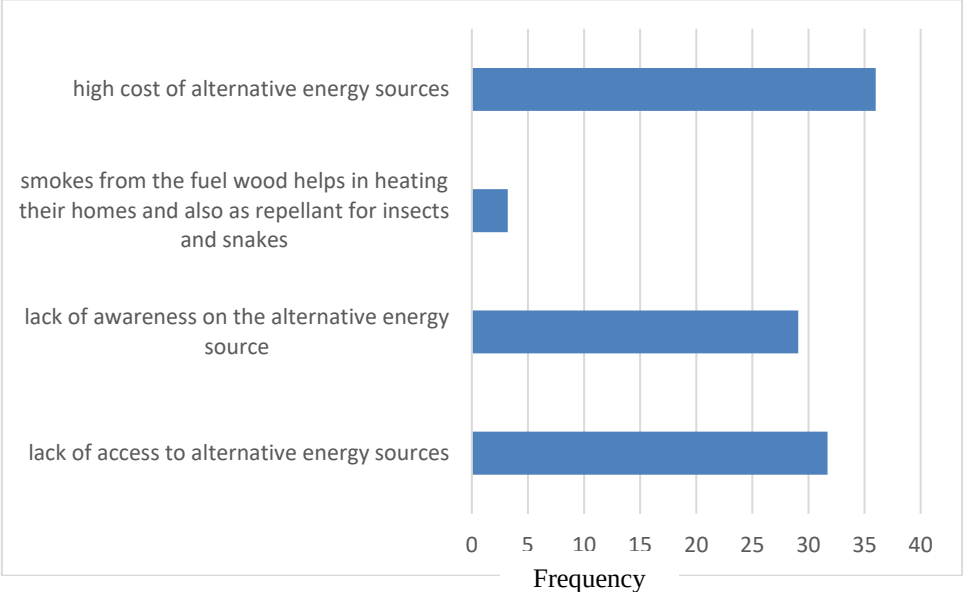

Figure 2: Factors that Determine the Use of Fuel Wood

4.6 Efforts at Replanting of Trees

The study revealed that there are no tree planting efforts carried out by respondents and relevant authorities (such as Ministry of Agriculture, Ministry of Environment among others) in Wushishi LGA for the purpose of replenishing the forest resources been depleted to ensure the sustainability of forest resources.

5. Conclusion and Recommendations

With the abundant renewable energy resources available across Nigeria, it is pertinent that we must adopt practical measures that will enhance the use of different renewable energy technologies for sustainable energy development. Deforestation is on the rise, particularly in the developing countries such as the study area and where majority live below the poverty line. The challenge of fuel wood consumption, is connected more to the lack of regular energy supply and the affordable cost of fuel wood and charcoal. However, deforestation poses a real threat to the long-term sustainability of forest resources. The implications of the continuous use of fuel wood on the environment are: deforestation, destruction of the ecological systems leading to loss of biodiversity and important wildlife, soil erosion, and declining agricultural productivity. Based on the findings, there is need to adopt and integrated approach to sustainable energy development through improved energy technologies to reduce the demand on fuel wood. Sensitization programmes should be organized for residents on alternative energy sources and the corresponding alternative energy technologies made available and affordable to residents of Wushishi. Also, tree planting campaign should be embarked upon by both residents and relevant authorities to replenish the depleted forest resources and for its sustainability.

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